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ter (1804) in the first volume of Occasional Papers issued by that institution. Two hundred and twenty-six species are noted as already described, but from localities not previously known. Of these 73 were found in the Calamianes Islands—all of them identical with species found in Palawan.

M. A. Pettit, having had an opportunity of examining the suprarenal capsules of two adult *Ornithorhyncus* (*O. paradoxus*) makes the following statements in regard to them. In size and general appearance the suprarenal capsules of *Ornithorhyncus* resemble those of mammals, while their position, within the posterior extremity of the kidney, is an Avian character. (Bull. Soc. Zool. de France, T. XIX, 1894).

ENTOMOLOGY.¹

A new *Tettix*.—In a series of specimens of Tettigidæ received from Mr. J. C. Warren of Palouse, Washington, I find a new form, see Fig. 1, nearly allied to *Tettix granulatus* but having certain recognizable differences as here described.

Tettix incurvatus sp. nov. Resembling *Tettix granulatus* nearly but differing as follows: Average length shorter, more robust, pronotum faintly bulging and deeper over the thorax, lateral angles more pronounced, median carina of pronotum distinctly elevated reaching the maximal height over the shoulders, a small swollen space here intercepting the base leaves the carina just in front sharply compressed, convexly sloping to the front, with a depression on each side—this is barely indicated in *T. granulatus*. Dorsal front and lateral front margin of pronotum encroaching on the head. Face broader, cheeks more swollen. Surface of pronotum densely granulated interspersed with fewer coarse granulations. Color dark brownish fuscous tending to black. In the male the wings slightly over reach the pronotum from $\frac{1}{2}$ to 1 mm.; in the female this condition varies, the wings slightly over reaching the pronotum in some cases, in other individuals the reverse is true. Specimens of *T. granulatus* from Indiana, Illinois and

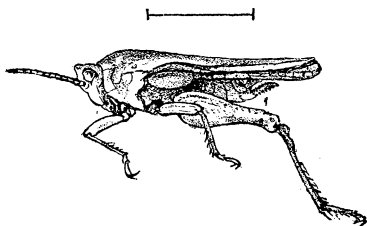
¹ Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.

Massachusetts, in my collection are almost uniformly slender, the pronotum nearly straight toward the front, and the median carina very slightly raised. A series of these examples brought together with the foregoing for comparison are easily separable.

MEASUREMENTS IN MM.

	Length.	Pronotum.	Hind Femora.
♀	14-15	13-13½	6½-7
♂	11-12	10-10½	5¼-6

This small locust abounds in openings among pines near the Palouse River, sometimes occurring on moss or white clover. Described from 12 males and 16 females from Palouse, Washington, (collected by J. C. Warren), in the authors collection.



Explanation of Fig. 1. Side view of *Tettix incurvatus* Hancock, enlarged, original, the line above shows natural size.—J. L. HANCOCK.

On the Early Stages of some Carabidæ and Chrysomelidæ.

—The descriptions of the larvæ of the species which follow should be compared by the student with those of *Chlaenius laticollis* and *C. leucoscelis* as given by Schaupp¹ and with Dugès'² figure and account of *Leptinotarsa lineata*. The details of some of the mouth-parts of the larva of *Cychrus elevatus* are introduced to show the peculiar armature of the mandible.

CYCHRUS ELEVATUS Fabr.

Larva found under a log (in cell, ready for pupation) April 23rd. Color above nearly black, beneath almost white, form robust rather resembling that of some Silphids. Pupated April 25th, pupa of an ordinary Carabidous form and without special marks though the deeply emarginate labrum and expanded tips of the palpi indicated its identity before the beetle was disclosed on the 10th of May. The figures of the mouth

¹ Bull. Brooklyn Ento. Soc., III, 17, 26.

² Ann. Soc. Ent. Belg., XXVIII, 1.

parts of the larva are introduced for comparison with those of other Carabids. The mandibles are long and curved, with a very strong tooth near the base, this tooth being pectinate on the inner margin and provided on the side with many short bristles. Still nearer the base of the mandible than the tooth is a bunch of long slender hairs. The maxillæ have only the basal joint left in my preparation—this is heavy and very spiny, bearing near its inner tip a bristle-tipped tubercle. The mentum is broader at tip, the palpi with bristly basal and naked second joint.

CHLÆNIUS SERICEUS Forst.

Larva of a greenish-black color with bronzed luster, head reddish, feet testaceous becoming piceous in the vicinity of the claws.

Form elongate, slightly convex above, more flattened beneath, tapering to both ends but more distinctly posteriorly. The ninth abdominal segment bears two processes or filaments about equal in length to the rest of the insect.

Head narrowed behind the eyes and slightly constricted into a neck; anterior to and between the eyes the upper surface is concave and with two very distinct longitudinal impressed lines. Beneath the surface is convex but with a distinct longitudinal groove and a large anterior triangular impressed space, the middle of which is slightly elevated. The upper and lower surfaces are both very finely granulate, the former with some distinct rugæ and punctures in addition. Hairs are visible only under a strong lens and are few in number.

Ocelli six, about a raised spot back of the antennæ.

Antennæ four-jointed, bristly, the first joint long, the second shorter, third a little longer than the second and bent near the tip. The fourth is scarcely half as long as the third and fusiform in shape.

Mandibles long, curved, armed below the middle with a strong tooth which is directed inwards and downwards; still nearer the base is a small bunch of hairs which lie against each other so closely as to simulate a spine and can only be resolved into components by the use of a high-power objective. This little bunch is, without doubt, the homologue of the large brush found in the larva of *Cychrus elevatus*.

Maxillæ with long stout basal joint bearing a few long spines and numerous more delicate hairs; inner lobe two-jointed, the basal joint the longer and stouter. Palpus four-jointed, first joint short and thick, second more slender and about twice as long, third about equal in length to the second, but more slender, fourth very small. Besides the palpus and inner lobe, the maxilla bears on its basal joint, just near the base of the lobe, a small bristle-tipped appendix of a single joint.

Mentum broader than long, quite bristly, the anterior margin produced at middle and emarginate at sides, the process bearing two long bristles which are approximated at tip and give the appearance of a single long stout spine. Palpi with large basal, shorter second and extremely minute third joint, the basal one alone somewhat feebly spinous.

Prothorax narrower anteriorly, about one-fourth broader than long, lateral and basal marginal lines distinct, anterior margin somewhat broadly depressed, angles rounded; an impressed median line is found, on each side, of which, is a less well-defined slightly oblique channel, deeply punctate at bottom. The whole disk is irregularly punctured, with intervening smooth spaces, the most evident of which are on each side of the above-described lateral grooves.

Meso- and metathorax, taken together, shorter than the prothorax, the impressions similar but broader and less well-defined, the discal punctures with a tendency to coalesce and form transverse rugæ.

Abdomen of nine true segments, slowly tapering, the margins of the first eight paler and apparently somewhat membranous in structure, the ninth bearing a long tubular anal segment and two processes which latter about equal the rest of the body in length and are black with a broad sub-basal orange band. These processes are rather thickly finely bristled and under high power the dark portions give a segmented appearance due probably to the surface being roughened by transverse ridges or scales.

Legs of an ordinary carabidous form—the figure shows a posterior member.

Pupa 10.5 mm. in length, the thorax narrow, with many dorsal bristles, the sides of the abdominal segments somewhat produced as shown in the figure.

The larvæ described were taken in July at Bayfield, Wis., under pieces of wood near ponds. They are hard to rear and only a small proportion could be brought to maturity. If the figures given by Schaupp³ are correct, the larva of my species differs greatly from his in the immense length of the caudal setæ.

DORYPHORA (*Mycocoryna*) LINEOLATA Stål.

Living larvæ cream-colored, pronotum with a yellowish tinge, head of a very light amber, legs black. The mandibles are dark, the tip of the antennæ and a frontal spot in the shape of a broad inverted V are black, as are also the front and hind margins of the pronotum. There is a

³ Tom. cit. Pl. (I), fig. B.

line of more or less confluent black spots along each side of the body from the base of the pronotum to the penultimate abdominal segment which is dusky over the most of its surface, while the terminal segment is shining and of a deep brown (or occasionally castaneous) color. A black dorsal line extends from near the middle of the metanotum on to the seventh abdominal segment and all the abdominal sutures are edged with black. A more or less interrupted line of brown dots and dashes extends from side to side of each of the first seven abdominal segments and in some cases a similar one occupies the same position on the meso- and metanotum, though they may be reduced to a lateral dot. Form heavy and thick-set much as in the larva of the common *D. decem-lineata*; the prothorax is broader and higher than the mesothorax, the abdomen broadest near the middle. The figure I give is of a specimen in the quiescent state immediately preceding pupation, as all were full grown when mailed to me and changed soon after reception. Length, measured on the chord of the curve 7 mm.

Labrum transverse, rounded in front and rather deep emarginate, the bottom of the margination round. The surface is bristled as shown in the figure.

Ocelli six in number and in two species; the first series, of four, is placed just behind the antenna, the other, of two, immediately beneath that organ.

Antennæ extremely small, short and thick, joints rapidly reducing in thickness.

Mandibles strong, heavy, curved, much flattened, five-toothed at the extremity. Two views are given to show the appearance under different aspects.

Maxillæ about equal to or a little shorter than the mandibles, the inner lobe short and heavy, beset with many spines around the edge. Palpi four-jointed, the first joint very large, the second narrower and shorter, the third again longer, the fourth about equal to the third in length and conical in shape, the tip truncate and beset with very small spines. The bristles on the first, second and third joints are few in number but very stout.

Mentum with the anterior angles turned inward and partially embracing the ligula which is slightly emarginate in front and bears short two-jointed palpi and several spines as figured. In this figure the mentum is drawn under pressure and the angles are everted from their ordinary flexed position.

Legs stout and rather short with a moderate number of strong spines as shown.

The pupa is very robust in form and about 7 mm. in length, the disk of the prothorax bears numerous short bristles, while the sides and dorsum of the abdomen are armed in the same way. The terminal segment bears a short, strong horny spine at apex. The eggs were too much damaged when received to admit of careful description, but were yellow in color and deposited in elongate masses, each egg attached by one end to the leaf of the food-plant. Eggs and full-grown larvæ were sent me by Professor Theo. D. A. Cockerell who collected them at San Augustine Ranch on the east side of the Organ Mountains of New Mexico in August.

State University of Iowa.

H. F. WICKHAM.

May 27th, 1895.

EXPLANATION OF PLATE.

Fig. 1. *Cychnus elevatus* Fabr.

Fig. 2. *Chlænium sericeus* Forst.

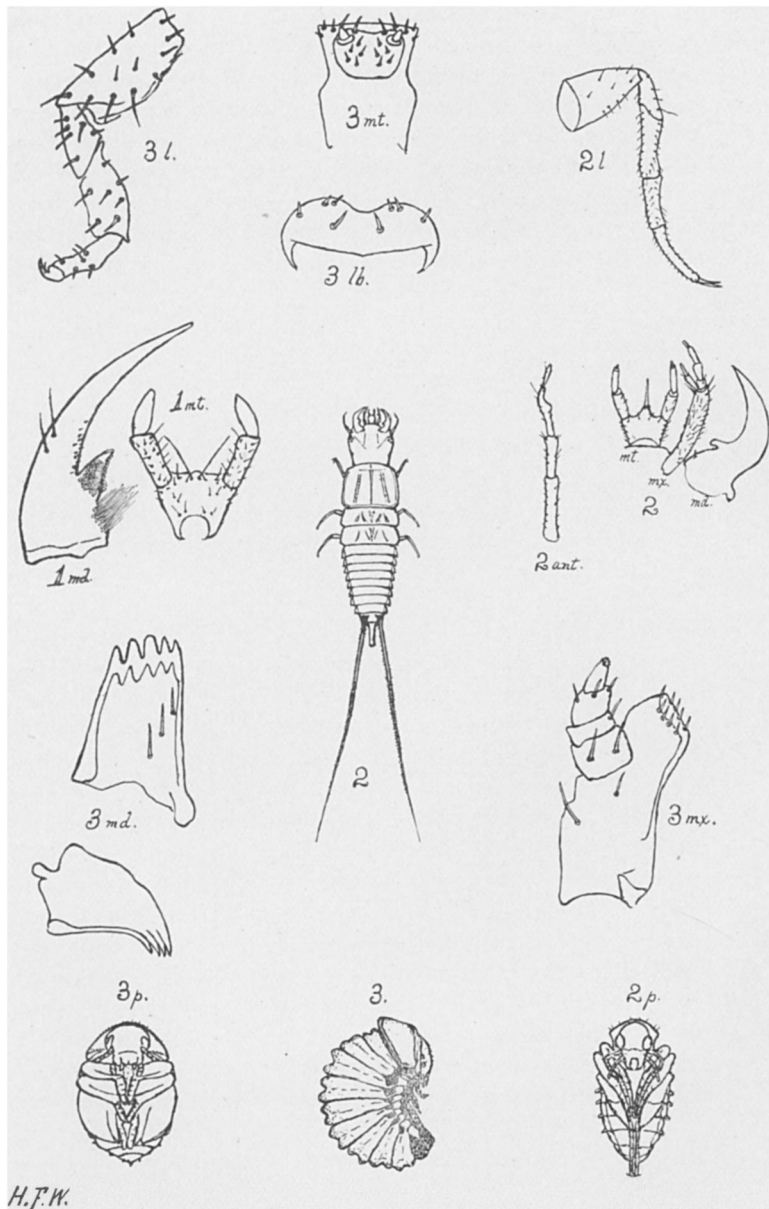
Fig. 3. *Doryphora (Mycocoryna) lineolata* Stål. All the dissections are lettered alike, ant., antennæ, l. leg, lb., labrum, md., mandible, mt., mentum, mx., maxilla.

Cecidomyia atriplicis [Towsend, Am. Nat., Nov., 1893, gall only] n. sp.—♀ about 4 mm. long, general color grey; abdomen blackish above, slightly reddish at sides, presenting, especially towards base, scattered silvery hairs. Ovipositor not exerted. Thorax above leaden-grey, with two distinct longitudinal grooves. Legs and antennæ grey. Eyes black, joining above, almost covering head. Halteres with the stem grey and the knob dull white. Base of occiput with the fringe of hairs. Antennæ with the whorls of hair obscure, 13-jointed, 3rd joint much longer than 4th, but hardly so long as 4-5, which are equal. Joints 4 to 11 decreasing gradually in length; 12 and 13 very small, looking like one deeply-constricted joint. Wings greyish-white, hardly at all translucent, veins grey, costal vein black, ending abruptly at junction with first longitudinal. Cross nervure slightly oblique, situated almost at base of wing. The anterior fork of the third longitudinal is very obscure, and there is a wing-fold stimulating a third longitudinal, so that the wing seems to have four longitudinal veins, all simple.

Pupa-shell reddish-brown, with the covering of the wings concolorous or rather paler.

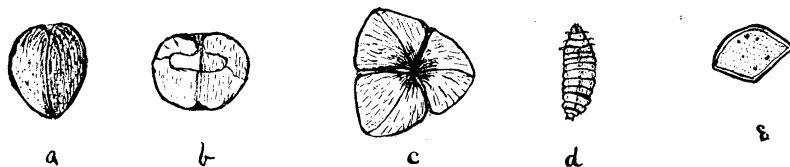
Hab. Bred, May 9, 1895, from galls on *Atriplex canescens* collected on College Farm, Las Cruces, N. M. The galls are red on one side.

PLATE XXX.



I am glad to have an opportunity of describing this species, since Prof. Townsend had already named it in connection with the galls.—T. D. A. COCKERELL, N. M. Agr. Exp. Sta.

Mexican Jumping Beans.—Occasionally one sees what are known as Mexican Jumping Beans, or Broncho Beans, exposed for sale in curiosity stores, or displayed as objects of interest in drug-stores, or other merchantile establishments. They are usually shown upon some smooth surface, as glass, the face of a mirror, or on the bottom of a smooth box. These beans are able to execute short leaps forward, or even turn over by a side-wise movement. If a dozen are placed in a box, so active are they, that some will be in motion most of the time. They are interesting objects both to grown people and children. Children will watch them by the hour and be amused. They appeal strongly to the sense of the marvelous in older people, who seek a cause for everything, as there is no apparent explanation of these erratic movements. All the risk of dispelling the charm that gives attractiveness to the mysterious, the following explanation of the phenomenon is given.



These animated curiosities are the product of the plant belonging to the Spurge Family (Euphorbiaceæ) known to botanists as *Sebastiania bilocularis*. To this same family belongs the Castor Oil Bean. Therefore it would not seem inappropriate to apply the name *bean* to these saltatorial seeds, though they bear no resemblance in shape to beans belonging to the Pulse Family.

The pods of plants belonging to the Spurge family are usually three lobed, as shown in cut C, and when ripe split up into three triangular valves with a rounded back as shown in cuts a, dorsal view, b face view, and e cross section. Each valve contains a single seed. It is to this tripartite form of the pod that the name Jumping Bean is applied. The plant they are obtained from has quite a wide geographical range, but the saltatorial seeds are found only in a limited area in *Sonora*, Mexico. Some of the seeds do not possess jumping powers and the active ones have to be selected. They are gathered by boys and find ready sale to travelers and dealers in curiosities. These diminutive "Bronchos" are

advertised to continue their antics for about nine months. This is approximately correct. If some of them are put in a box and examined the following season their movements will have ceased. Small holes will be found in the seeds as though something had gnawed out. In the bottom of the box small moths will be found. If the beans are opened while still active in each one will be found a worm or larva snugly tucked away in the interior. One of these larva is shown in cut *c* natural size. The worm is pale yellowish with a brown head, which has a triangular darker patch in the middle, and black mouth parts. There are eight true legs, six anterior and a single pair posterior and four pairs of false feet, pale pink at the ends. There is a pale brownish stripe down the back. Our specimens were examined November 1st. The seed was entirely eaten, the pod only remaining, cut *e* shows a cross section of one of the beans, the dotted portion was eaten. The worm was plump and fat, evidently having relished the oily seed, a taste we can hardly appreciate if the oil of these seeds has the some flavor and properties as Castor Oil. If these larvæ remain active until next summer they will have to live a long time on their accumulated fat, as their food supply was exhausted November 1st. Possibly their restlessness may be the throes of hunger. They probably go into the quiescent or *pupa* state before winter and remain inactive until time to transform the following summer. The worms do not entirely fill the space that was occupied by the seed and by suddenly changing their position they are able to give movements to the light seed pods they occupy. If the seeds are disturbed the worms become quiet for a time. This is an inborn instinct for self-preservation, like that of feigning death, so common among insects.

These worms in due time change to the *pupa* state and finally emerge as small *moths* belonging to the order *Lepidoptera*, Family *Tortricidæ*, which embraces the *Codling Moth* and a host of other small moths many of which are more or less injurious. This species is known to entomologists as *Graptolitha sebastianæ* Riley.

We presume the moths lay their eggs in the young growing pods, as there is no evidence in the mature pods of the method of entrance. The eggs hatch and the young worms feed upon the developing seed and finally spend the winter in the cavity thus formed. They finally change to the quiescent stage and in due time transform to moths gnaw out and are ready to lay eggs again, thus completing the cycle of life. That which appears marvelous often becomes common place when viewed by the light of some natural cause. But the life history of this insect regardless of the movements it causes in seeds is interesting, illustrat-

ing as it does the wonderful provision made by host plants to entertain and preserve the parasites that infest them.—F. L. HARVEY, Orono, Maine.

EMBRYOLOGY.¹

Half Embryos versus Whole Embryos.—In a brief contribution to the *Anatomische Anzeiger* Dr. T. H. Morgan makes an important advance toward the comprehension of the much vexed question as to what may arise from part of an egg, a part or a whole embryo.

Roux claimed that when one of the first two cells of a cleaving frog's egg was killed by a hot needle, the other cell formed only half an embryo. Hertwig, however, in repeating these experiments obtained whole embryos of small size. Then Born showed that when a frog's egg is fixed upside down, the contents rotate and become differently arranged. Finally O. Schultze has shown that if the egg is fixed upside down in the two-celled stage, it will form two embryos, each of half the normal size.

With these facts in mind Morgan repeated the experiments of Roux and Hertwig to see if the contradictory results might not be due to their having overlooked an important factor, namely, the *position* of the cells.

The results obtained are that when most of the 155 eggs were fixed upside down, six half embryos and two whole embryos were reared, eight in all. Of these, the six half embryos came from the few eggs that were fixed in the normal position, that is, with the black part of the egg uppermost. The two perfect, but half sized embryos, came from the large number of eggs fixed upside down, or with the white side uppermost.

In another set of experiments subsequently undertaken, five half embryos were formed from 92 eggs kept in the normal position. In another case from 125 eggs fixed upside down seven whole embryos and three half embryos were obtained.

It seems that in all the eggs tried, half embryos resulted when the egg was fixed in the normal position and one of the first two cells killed. On the other hand, in most cases tried, small whole embryos were

¹ Edited by E. A. Andrews, Baltimore, Md., to whom abstracts, reviews and preliminary notes may be sent.